

3.8 AIR QUALITY

This section summarizes the *SR-22/West Orange County Connection Air Quality Technical Report* and the *Air Quality Technical Report Reduced Build Alternative Addendum* (January 2001, revised 2002), and the August 2001 DEIR/EIS. For a more detailed analysis, these documents are available at the Department and OCTA under separate cover.

3.8.1 RELEVANT POLLUTANTS

The US EPA has identified six criteria air pollutants as being of national concern: carbon monoxide (CO), sulfur oxides (SO_x), nitrogen oxides (NO_x), ozone (O₃), particulate matter (PM_{10,2.5}), and lead (Pb).

3.8.2 AIR QUALITY REGULATIONS AND PLANNING

A. NATIONAL AMBIENT AIR QUALITY STANDARDS

Air quality is regulated at the federal level under the Clean Air Act (CAA) and the Final Conformity Rule (40 CFR Parts 51 and 93). The CAA authorizes the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for air pollutants of nationwide concern and requires each state to submit a State Improvement Plan (SIP) detailing its strategies for attaining the standards. Air quality is regulated at the state level under the California Clean Air Act of 1988 (AB 2595). The California Clean Air Act requires all districts that are designated as nonattainment for any pollutant to "adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under their jurisdiction."

Both the EPA and the California CAA have established NAAQS for the following air pollutants: CO, O₃, NO₂, PM₁₀, SO_x, and Pb. Both the state and federal standards are shown in Table 3.8-1.

According to the US EPA, PM is the general term used for a mixture of solid particles and liquid droplets found in the air. Some of these particles are large or dark enough to be seen as soot or smoke, while others are so small they can be detected only with an electron microscope. These particles, which come in a wide range of sizes ("fine" particles are less than 2.5 micrometers in diameter and coarser-size particles are larger than 2.5 micrometers), originate from many different stationary and mobile sources as well as from natural sources. Fine particles (PM-2.5) result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Coarse particles (PM-10) are generally emitted from sources, such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust. Some particles are emitted directly from their sources, such as smokestacks and cars. In other cases, gases such as sulfur oxide and SO₂, NO_x, and VOC interact with other compounds in the air to form fine particles. Their chemical and physical compositions vary depending on location, time of year, and weather.

In 1997, EPA added two new PM-2.5 standards, set at 15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 65 $\mu\text{g}/\text{m}^3$, respectively, for the annual and 24-hour standards. In addition, the form of the 24-hour standard for PM-10 was changed. EPA is beginning to collect data on PM-2.5 concentrations. Beginning in 2002, based on three years of monitoring data, EPA will designate areas as nonattainment that do not meet the new PM-2.5 standards.

Between 1988 and 1997, the average PM-10 concentrations decreased 26 percent. Short-term trends between 1996 and 1997 showed a decrease of 1 percent in monitored PM-10 concentration levels.

The emissions estimates presented above do not include emissions from natural and miscellaneous sources, such as fugitive dust (unpaved and paved roads), agricultural and forestry activities, wind erosion, wildfires and managed burning. These emissions estimates also do not account for PM that is secondarily formed in the atmosphere from gaseous pollutants (i.e., SO₂ and NO_x).

B. ATTAINMENT STATUS OF STUDY AREA

The study area is located in the South Coast Air Basin (SCAB). The SCAB is in nonattainment status for state and federal Ambient Air Quality Standards (AAQS) for four of the six criteria air pollutants. Currently, the basin exceeds the federal standards for ambient CO, O₃, and PM₁₀ levels. NO_x levels have been below the federal standard, but the basin is the only area that has not been reclassified to attainment status for this criteria pollutant.

The SCAQMD and SCAG are the agencies responsible for preparing the Air Quality Management Plan (AQMP) for the SCAB. Since 1979 a number of AQMPs have been prepared. The most recent comprehensive plan fully approved by the U.S. EPA is the 1997 Air Quality Management Plan (1997 AQMP), which includes a variety of strategies and control measures. The 1997 AQMP was based on the 1994 AQMP and was designed to comply with State and federal requirements. The goal of the 1997 AQMP was to be less reliant on transportation control measures, be less reliant on long-term control measures that rely on future technologies as allowed under 182(e)(5) of the CAA, and removal of other infeasible control measures and indirect source measures.

The AQMP is a dynamic document that is updated every three years. The most recent 1997 AQMP is based on the 1994 Plan and carries forward most of the strategies included therein. However, with recent findings by nationally recognized health experts, the new Plan puts greater emphasis on PM₁₀ particulate matter. In fact, the 1997 AQMP is required by federal law to demonstrate attainment of the federal PM₁₀ ambient air quality standards. The 1997 Plan also updates the demonstration of attainment of ozone and carbon monoxide levels. Additionally, because the Basin came into attainment of the federal nitrogen dioxide standard since the 1994 AQMP was prepared, the new Plan includes a maintenance program to assure continued compliance.

The 1997 AQMP also addresses several State and Federal planning requirements and incorporates new scientific data, primarily in the form of updated emissions inventories, ambient measurements, and new air quality models. Expanding on the control strategies included in the 1994 AQMP, the 1997 Plan projects sufficient emissions reductions to meet all federal criteria pollutant standards within the time frames allowed under the Federal Clean Air Act.

The 1997 AQMP also addresses notable regulatory rules promulgated since the preparation of the 1994 Plan. These include the implementation of Phase II reformulated fuels in 1996, the replacement of Regulation XV rideshare program with an equivalent emission reduction program, and new incentive programs for generating emission credits. Other highlights of the 1997 Plan are noted below.

- Use of the most current air quality information (1995), including special particulate matter data from the PM₁₀ Technical Enhancement Program;
- Improved emissions inventories, especially for motor vehicles, fugitive dust and ammonia sources;
- A similar but fine-tuned overall control strategy with continuing emphasis on flexible alternative approaches including intercredit trading;
- A determination that certain control measures contained in the 1994 AQMP are infeasible, most notably the future indirect source measures;
- Enhanced modeling for particulates;
- Separate analyses for the desert portions within the District's jurisdiction: the Coachella Valley within the newly designated Salton Sea Air Basin; and the Antelope Valley within the Mojave Desert Air Basin;
- Attainment to the federal Post-1996 Rate-of-Progress Plan and the Federal Attainment Plans for ozone and carbon monoxide;
- A maintenance plan for nitrogen dioxide; and
- An attainment demonstration and State Implementation Plan Revision for PM₁₀.

In 1999, the ozone plan portion of the 1997 AQMP was amended in conjunction with a settlement of litigation by environmental groups challenging the 1997 plan to provide the following:

- Greater emission reductions in the near-term than would occur under the 1997 AQMP;
- Earlier adoption of the measures that would otherwise be contained in the next three years' update of the AQMP; and
- Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.

In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the State's requirements for a triennial plan update.

C. CONFORMANCE WITH AIR QUALITY STANDARDS

Under the Clean Air Act Amendments of 1990 (CAAA), the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the Transportation Equity Act for the 21st Century (TEA-21), proposed transportation projects must be derived from a long-range transportation plan (LRP) or Regional Transportation Plan (RTP) that conforms with the state air quality plans as outlined in the SIP. The SIP sets forth the state's strategies for achieving air quality standards. Projects must also be included in a Transportation Improvement Program (TIP) that conforms with the SIP, and localized impacts from proposed projects must conform to state air quality plans in nonattainment and maintenance areas.

Southern California Association of Governments (SCAG), as the federally designated Metropolitan Planning Organization (MPO) for most of Southern California, is required to adopt and periodically update a long-range transportation plan and develop an RTP and TIP for Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial Counties.

The SCAG Regional Council found the 1998 RTP¹ to conform to the SIP and adopted the 2001 RTP for the six-county SCAG region on April 16, 2001. Federal approval of the 2001 RTP was obtained in June 2001. The RTP, known as Community Link 21, is a performance-based plan aimed at providing a long-range, coordinated approach to transportation improvements from 2001 through 2025.

3.8.3 AMBIENT AIR QUALITY IN THE STUDY AREA

A. LOCAL METEOROLOGY

The study area is located in the 17,000-square-kilometer (6,800-square-mile) South Coast Air Basin. The region experiences more days of sunlight than any other major urban area in the nation except Phoenix. The combination of the topography and climate in the Basin provides the region with potential for high air pollution.

B. LOCAL MONITORED AIR QUALITY

The SCAB air pollutant levels are measured at monitoring stations that the SCAQMD and the CARB maintain. The monitoring stations nearest the project study area are located in Anaheim, Costa Mesa and north Long Beach. The last three years of monitored data available for these locations are summarized in Table 3.8-2 to illustrate the study area's general air quality trends. The monitoring station nearest to the project study area that measures PM_{2.5} is located in north Long Beach. Three years of monitored data at this location, 1997 through 1999, are summarized in Table 3.8-3. PM_{2.5} data for 2000 and 2001 are not yet available at this location.

¹ Available at OCTA.

**Table 3.8-1
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O ₃)	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	0.12 ppm (235 µg/m ³)	Same as Primary Standard	Ethylene Chemiluminescence
	8 Hours	-		0.08 ppm (157 µg/m ³)		
Respirable Particulate Matter (PM ₁₀)	Annual Geometric Mean	30 µg/m ³	Size Selective Inlet Sampler CARB Method P (8/22/85)	-	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	24 Hours	50 µg/m ³		150 µg/m ³		
	Annual Arithmetic Mean	-		50 µg/m ³		
Fine Particulate Matter (PM _{2.5})	24 Hours	No Separate State Standard		65 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean			15 µg/m ³		
Carbon Monoxide (CO)	8 Hours	9.0 ppm (10 mg/m ³)	Non-dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)-		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	-	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 µg/m ³)		-		
Lead (Pb)	30-day average	1.5 µg/m ³	AIHL Method 54 (12/74) Atomic Absorption	-	-	High-volume Sampler & Atomic Absorption
	Calendar Quarter	-		1.5 µg/m ³	Same as Primary	
Sulfur Dioxide (SO ₂)	3 Hours	-		-	0.5 ppm (1,300 µg/m ³)	Pararosaniline
Sulfates	24 Hours	25 µg/m ³	Turbidimetric Barium Sulfate AIHL Method 61 (2/76)	No Federal Standards		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Cadmium hydroxide STRactan			
ppm µg/m ³ mg/m ³ mm parts per million micrograms/square mete milligrams/square meter millimeter						
° C degrees Celcius						
¹ State standards for O ₃ , CO, SO ₂ (1- and 24-hour), NO ₂ , PM ₁₀ , & visibility-reducing particles not to be exceeded. All others not to be equaled or exceeded. State AAQS listed in Table of Standards, Section 70200, Title 17, CCR. Section 70200.5 lists vinyl chloride (chloroethene) under "AAQS for Hazardous Substances." In 1978, CARB adopted vinyl chloride standard of 0.010 ppm (26 µg/m ³) (24-hour average), measured by gas chromatography. Standard notes that vinyl chloride is "known human and animal carcinogen" & that "low-level" effects are undefined, but are potentially serious. Level not threshold level & does not necessarily protect against harm. Level specified is lowest level at which violation can be reliably detected by method specified. Ambient concentrations => standard constitute endangerment to public health. In 1990, CARB identified vinyl chloride as Toxic Air Contaminant & determined there was not sufficient available scientific evidence to support identification of threshold exposure level. This allows implementation of health-protective control measures at levels < 0.010-ppm ambient concentration specified in 1978 standard.						
² National standards (other than O ₃ , PM ₁₀ , and those based on annual averages or annual arithmetic mean) not to be exceeded more than once a year. O ₃ standard attained when 4 th highest 8-hour concentration in a year, averaged over 3 years, =< standard. For PM ₁₀ , 24-hour standard attained when 98% of daily concentrations, averaged over 3 years, =< standard. Contact EPA for further clarification & current federal policies.						
³ Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses based upon a reference temperature of 25° C & a reference pressure of 760 mm of mercury (1,013.2 millibar). Most measurements corrected to 25° C & 760 mm; ppm in this table refers to ppm volume, or micromoles of pollutant per mole of gas.						
⁴ Any equivalent procedure that can be shown to the satisfaction of CARB to give equivalent results at or near the level of air quality standard may be used.						
⁵ Levels necessary, with adequate margin of safety to protect public health.						
⁶ Levels necessary to protect public welfare from any known or anticipated adverse effects of pollutant.						
⁷ Reference method as described by EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by EPA.						

Table 3.8-2
AIR QUALITY SUMMARY FOR STUDY AREA MONITORING STATIONS

Air Pollutant	Standard/ Exceedance	Anaheim Harbor Boulevard			Costa Mesa <i>Mesa Verde Drive</i>			North Long Beach North Long Beach Boulevard		
		1999	2000	2001	1999	2000	2001	1999	2000	2001
Carbon Monoxide (CO)	Max. 1-hour Concentration (ppm)	8.3	7.9	7.5	7.9	7.8	6.2	7.5	9.7	6.0
	Max. 8-hour Concentration (ppm)	5.34	6.73	4.69	6.41	6.29	4.64	5.49	5.73	4.00
	# Days>Federal 1-hour Std. of >35 ppm	NA	0	0	NA	0	0	0	0	0
	# Days>Federal 8-hour Std. of >9 ppm	0	0	0	0	0	0	0	0	0
	# Days>California 1-hour Std. of >20 ppm	NA	0	0	NA	0	0	0	0	0
	# Days>California 8-hour Std. of >9.0 ppm	0	0	0	0	0	0	0	0	0
Ozone (O₃)	Max. 1-hour Concentration (ppm)	0.098	0.132	0.107	0.098	0.102	0.098	0.131	0.118	0.091
	Max. 8-hour Concentration (ppm)	0.076	0.097	0.069	0.075	0.086	0.073	0.081	0.081	0.070
	# Days>Federal 1-hour Std. of >0.12 ppm	0	1	0	0	0	0	1	0	0
	# Days>Federal 8-hour Std. Of >0.08 ppm	0	1	0	0	1	0	0	0	0
	# Days>California 1-hour Std. Of >0.09 ppm	1	9	2	1	1	1	3	3	0
Nitrogen Dioxide (NO₂)	Max. 1-hour Concentration (ppm)	0.117	0.139	0.127	0.123	0.107	0.082	0.151	0.140	0.121
	Annual Arithmetic Mean (ppm)	NA	0.029	NA	0.020	0.020	NA	0.034	0.032	NA
	% AAM Exceeded (Federal)	NA	NA	NA	NA	NA	NA	0	0	0
	# Days>California 1-hour Std. of >0.25 ppm	0	0	0	0	0	0	0	0	0
Sulfur Dioxide (SO₂)	Max. 24-hour Concentration (ppm)	NM	NM	NM	0.005	0.006	0.004	0.011	0.007	0.009
	Annual Arithmetic Mean (ppm)	NM	NM	NM	0.002	0.002	0.001	0.003	0.002	0.002
	# Days>Federal 24-hour Std. of >0.14 ppm	NM	NM	NM	0	0	0	0	0	0
	# Days>California 24-hour Std. of >0.04 ppm	NM	NM	NM	0	0	0	0	0	0
Suspended Particulates (PM₁₀)	Year Coverage*	77%	91%	33%	NM	NM	NM	99%	95%	22%
	Max. 24-hour Concentration (µg/m ³)	122	126	93	NM	NM	NM	79	105	91
	#Days>Fed. 24-hour Std. of >150 µg/m ³	0	0	0	NM	NM	NM	0	0	0
	#Days>California 24-hour Std. of >50 µg/m ³	15	8	6	NM	NM	NM	13	12	6
	State Annual Average (µg/m ³)	43	36	36	NM	NM	NM	36.4	34.0	35.8
Lead	Maximum Monthly Concentration (µg/m ³)	NM	NM	NM	NM	NM	NM	NM	NM	NM
	# Months Exceeding Federal Std.	NM	NM	NM	NM	NM	NM	NM	NM	NM
	# Months Exceeding State Std.	NM	NM	NM	NM	NM	NM	NM	NM	NM
Sulfates	Max. 24-hour Concentration (µg/m ³)	NM	NM	NM	NM	NM	NM	NM	NM	NM
	#Samples>California 24-hour Std. >=25 µg/m ³	NM	NM	NM	NM	NM	NM	NM	NM	NM

Source: California Air Resources Board 1999, 2000, 2001.

* Year Coverage indicates how extensive monitoring was during the time of year when high pollutant concentrations were expected.

NM: Pollutant not monitored

NA: Pollutant not available

Table 3.8-3
AIR QUALITY SUMMARY FOR PM_{2.5} MONITORING STATION
CLOSEST TO PROJECT STUDY AREA

Air Pollutant	Standard/ <i>Exceedance</i>	North Long Beach		
		1997	1998	1999
Fine Particles (PM _{2.5})	Year Coverage*	87	88	30
	Maximum Annual Concentration (µg/m ³)	51	42	42
	#Days>Federal Std. of>65 µg/m ³	0	0	0
	98 th Percentile	49.0	39.0	42.0
	National Annual Average (µg/m ³)	17.0	16.0	17.9
	3-year National Average**	19.0	17.7	17.0

Source: California Air Resources Board 1997, 1998, 1999.

* Year Coverage indicates how extensive monitoring was during the time of year when high pollutant concentrations were expected.

** The 3-year statistics include data from the listed year and the two years before the listed year.